Architectural Framework for the future International Space Station 2

By Nicholas Varias Architect

This paper proposes a concept for an architectural framework for a new International Space Station. The concept has the following objectives:

1. Creating and Evaluating Artificial Gravity (AG)
2. Functional Flexibility of components
3. Expandability
4. Experimental Manufacturing in space
5. Economically and Technically feasible in the near future

The main objective is to develop the infrastructure in space for evaluating the long-term effects of Artificial Gravity on human health and functioning. AG will be created through centripetal forces generated by spinning the living quarters on a 50m radius circle. The revolving velocity will be one of the parameters subject to experimentation.

The ISS2 will be composed of 2 main assemblies. The Rotating Assembly (RAS) will be revolving around an axle which is the centre of the Stem Modules (SM). The Static Assembly (SAS) will remain fixed around the same axle and will be connected to the RAS through the Motion Switch Hub (MS). The MS will have a special core developed to allow communication between the two assemblies without having to stop the RAS.

The RAS will have 3 Space Habitat modules (SH). They will be kept in a stable equilateral triangle configuration by 3 sets of Spoke Modules (SP), a central Habitat Hub (HH) with Stem Modules (SM) and tension cables (C). Between each SH and the peripheral SP, there will be a Propulsion for AG module (PA), which will provide the forces for inducing and breaking rotation. The Radius could be increased by adding SPs to the 3 spokes.

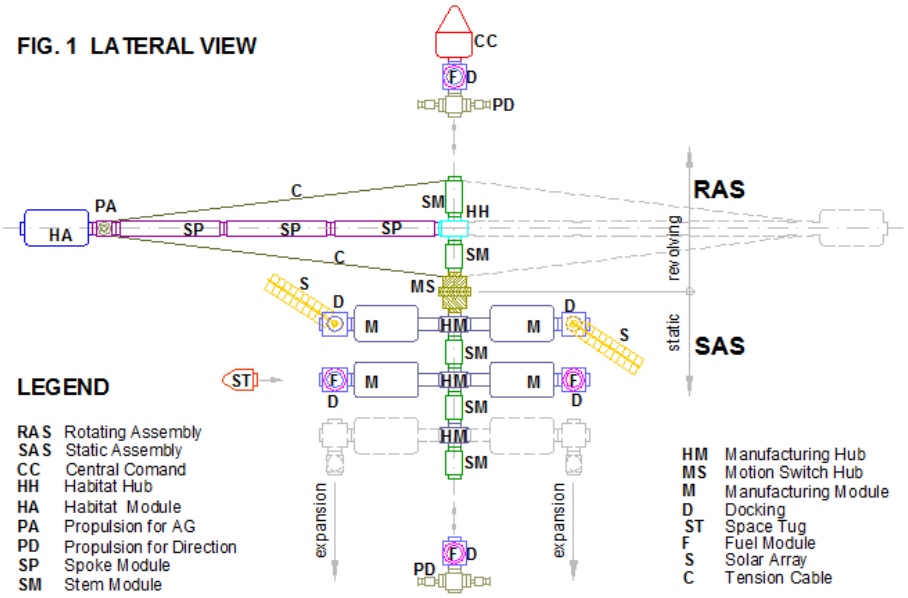
The SAS will be used for Research and Manufacturing in Weightlessness, and will provide the means to achieve the economic viability of ISS2, through joint ventures with the private sector. The Manufacturing Modules (M) will form hexagonal clusters of 6 units, attached to Manufacturing Hubs (MH) and SMs. The Static Assembly (SAS) will also incorporate Docking Modules (D), Fuel units (F) and Solar Arrays (S). The D, F and PD units at the end of SAS can be moved by a Space Tug (ST) to allow the insertion of an HM and M units, for expansion.

The Central Command module (CC) will have its own D, F and Propulsion for Direction (PD), and will be able to move from the top of the RAS to other docking modules. The PDs will also control the positioning of ISS2.

The SPs and SMs will be cylindrical, with a central circulation tunnel and air locks at both ends. The spoke and stem modules will have a circular cross section with a core circular tube for circulation.

This is only a brief outline of the concept, which will require further research, study and design of the framework and of all components.

FIG. 1 LATERAL VIEW



LEGEND

RAS	Rotating Assembly
SAS	Static Assembly
CC	Central Comand
HH	Habitat Hub
HA	Habitat Module
PA	Propulsion for AG
PD	Propulsion for Direction
SP	Spoke Module
SM	Stem Module
HM	Manufacturing Hub
MS	Motion Switch Hub
M	Manufacturing Module
D	Docking
ST	Space Tug
F	Fuel Module
S	Solar Array
C	Tension Cable

FIG. 2 VIEW of STATIC ASSEMBLY